C101 ISA/PCI SuperSync Board
User' s Manual

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user ID: ..... *ftp*

password: ..... your_email_address

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1
Introduction

Welcome to the Moxa C101 SuperSync Board Family, designed to provide efficient and cost-effective synchronous serial communications. This chapter introduces the features and appearance of C101 and includes the following sections.

- **Overview**
- **Features**
- **Specifications**
- **Package Checklist**

Overview

The C101 SuperSync Board Family consists of two products, an ISA board and a PCI board, both of which provide programmers with a cost-effective asynchronous communications solution. These boards have one programmable RS-232 port, and are able to connect to a wide range of hosts using either public or proprietary communications protocols. The C101 boards use the Hitachi HD64570 SCA (Serial Communications Adapter) chip, which is a highly integrated communications subsystem, and includes a sync port, built-in DMA controller, 32 byte FIFO, and interrupt and timer logic. DMA (Direct Memory Access) technology also helps the C101 boards lower system overhead while boosting data transmission speed up to 4 Mbps. Onboard dual-ported memory is directly addressable by both the system and SCA' s DMA.

Features

- Powerful Hitachi HD64570 serial communications adapter
- Sync I/O rate up to 4 Mbps for V.35, or 128 Kbps for RS-232
- V.35/RS-232 selectable interface
- PCI or ISA bus available
- Supports HDLC, SDLC, BSC, developer' s tool
- Supports Windows NT, DOS, Linux (PPP)
- Supports C/C++, Visual Basic, and Delphi programming library
- Supports both Bit Sync and Byte Sync

Specifications

I/O controller	Hitachi HD 64750 USART Serial Communication Adapter with DMA Controller
Memory	PCI: 512 KB dual-ported RAM ISA: 256 KB dual-ported RAM
Bus	PCI ver. 2.1 (32 bit) or ISA (16 bit)
No. of ports	One sync port
Sync interface	RS-232/V.35 interface selectable
Speed	4 Mbps (V.35); 128 Kbps (RS-232)

❑ Max. No. of ports	4 (4 boards per Windows NT, Linux, and DOS systems) 1 (1 board per Windows 3.x system)
❑ IRQ	PCI: Assigned by BIOS ISA: 2, 3, 4, 5, 7, 10 (default), 11, 12 or 15 (jumper selectable)
❑ Transmit Clocking	PCI: Assigned by BIOS ISA: Internal/External (jumper selectable)
❑ Power requirements	555 mA (5V); 19 mA (+12V); 23 mA (-12V)
❑ Operating temp.	0 – 55°C
❑ Dimensions	PCI: 135 × 100 mm (W×D) ISA: 160 × 92 mm (W×D)
❑ Package weight	0.3 kg
❑ Regulatory approvals	FCC, CE

Package Checklist

C101 SuperSync Boards are shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- ❑ C101 SuperSync Board (ISA or PCI)
- ❑ Software CD
- ❑ User's Manual
- ❑ MOXA Product Warranty booklet

2

Hardware Installation

This chapter includes instructions on how to install the C101 SuperSync board in your PC.

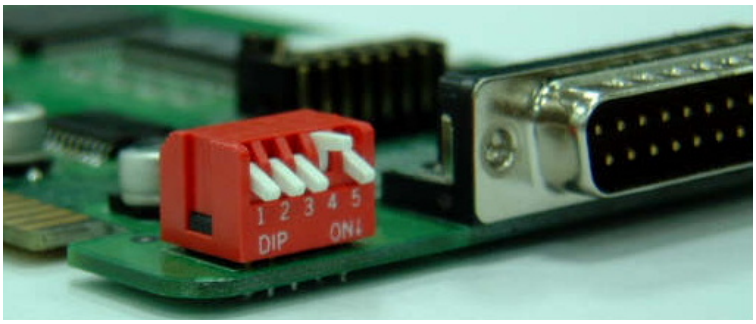
- **C101/ISA Hardware Installation**
- **C101/PCI Hardware Installation**

C101/ISA Hardware Installation

The C101/ISA SuperSync board is an asynchronous serial communications board that uses onboard jumpers and DIP switches to configure the board' s essential operation parameters. You may refer to the following sections to learn how to configure the C101/ISA board' s *base address*, *IRQ number*, *interface type,* and *clock direction*. Note that this configures the board itself. As we will see in the next chapter, each of these items must also be configured on the software side of the board' s operation after the driver is installed.

Base Address

The *base address* is the memory address of the first byte of a 16 KB window, located in your PC' s memory, that is used during the operation of C101/ISA. The base address is set using 5 DIP switches located next to the board' s serial connector, as shown in the following photograph. Note that *down* is the DIP switch' s ON position.

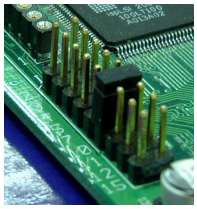


There are six base addresses from which to choose (see table below). Choose an address not being used by the expansion memory or other add-on cards. Note that if you want to add more than one C101/ISA board, each board must use a different IRQ number.

	DIP Switch No.					
	1	2	3	4	5	Base Address
default →	ON	ON	ON	OFF	ON	0xC8000
DIP Switch Setting	ON	ON	ON	OFF	OFF	0xCC000
	ON	ON	OFF	ON	ON	0xD0000
	ON	ON	OFF	ON	OFF	0xD4000
	ON	ON	OFF	OFF	ON	0xD8000
	ON	ON	OFF	OFF	OFF	0xDC000

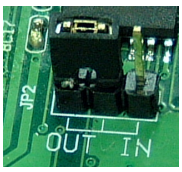
IRQ Number

The IRQ number, in which IRQ stands for *interrupt request*, is used to inform the PC's operating system which device is requesting its attention. There are 9 choices of IRQ (2, 3, 4, 5, 7, 10, 11, 12, and 15), with the board's IRQ number configured using Jumper 1 (JP1), as shown in the adjacent photograph. The factory default is 10.



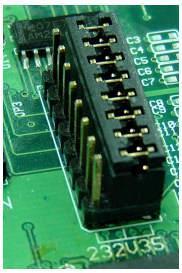
Clock Direction

The C101/ISA board supports two transmit clock modes: OUT and IN. This applies to the situation when the C101 board is transmitting (as opposed to receiving) data. Choosing mode OUT means that the board supplies the clock while transmitting data, whereas choosing mode IN means the device that is receiving data from the C101 board supplies the clock. The transmit clock direction is set using Jumper 2 (JP2), as shown in the photo. The factory default is OUT.



Interface Type

The C101/ISA board supports two interface types: RS-232 and V.35. Use Jumper 3 (JP3) to select which interface type is used, as shown in the photo. Note that the C101/ISA board comes with an RS-232/DB25 serial port. When using V.35, the user must attach an RS-232/DB25 to V.35 cable. The factory default is V.35.



C101/ISA Hardware Installation Procedure

The following steps give the procedure for installing the C101/ISA board in your computer. The procedure is simple and straightforward, but as with any sensitive electronic equipment, care must be taken not to damage the board, or the computer in which it is being installed.

1. Power off the PC and remove the PC cover.
2. Configure the C101/ISA board' s
   - Base address
   - IRQ number
   - Clock direction
   - Interface type

   as outlined in the previous section.
3. Locate an available 16-bit ISA expansion slot. Remove the slot' s retaining screw and put it aside.
4. Remove the ISA expansion slot' s cover.
5. Orient the C101/ISA board' s connector edge so that it is facing downwards, and then place the connector edge into the I/O slot. Press the board firmly until it snaps into the plastic edge connector socket on the computer' s motherboard.
6. Use the retaining screw to secure the C101/ISA board to the PC' s rear panel.
7. Replace the PC cover.

C101/PCI Hardware Installation

The C101/PCI SuperSync board is an intelligent asynchronous serial communications board (i.e., it has a built-in CPU). There are no onboard jumpers or DIP switches, which means that installing the PCI board involves simply inserting the board into an empty PCI slot.

C101/PCI Hardware Installation Procedure

The following steps give the procedure for installing the C101/PCI board in your computer. The procedure is simple and straightforward, but as with any sensitive electronic equipment, care must be taken not to damage the board, or the computer in which it is being installed.

1. Power off the PC and remove the PC cover.
2. Locate an available 32-bit PCI expansion slot. Remove the slot's retaining screw and put it aside.
3. Remove the PCI expansion slot's cover.
4. Orient the C101/PCI board's connector edge so that it is facing downwards, and then place the connector edge into the I/O slot. Press the board firmly until it snaps into the plastic edge connector socket on the computer's motherboard.
5. Use the retaining screw to secure the C101/PCI board to the rear panel.
6. Replace the PC cover.

Installing Additional Boards

You may repeat the above procedure to install additional boards in the same computer, with a maximum of four C101/ISA and/or C101/PCI boards allowed per computer.

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Software Installation

This chapter includes instructions on how to install the drivers used to control your C101 SuperSync Boards.

- **Windows NT**
- **MS-DOS**

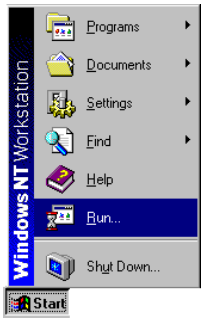
Windows NT

Moxa provides Windows NT drivers for both the C101/ISA and C101/PCI boards.

C101 Windows NT Driver Installation

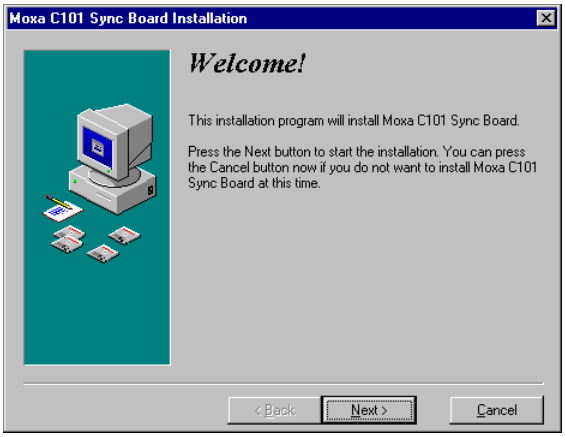
Follow these simple steps to install the Windows NT driver for both the C101/ISA and C101/PCI boards.

1. Insert the software CD into your computer' s CD ROM drive.
2. From the NT desktop, click on **Start** and then select **Run**.

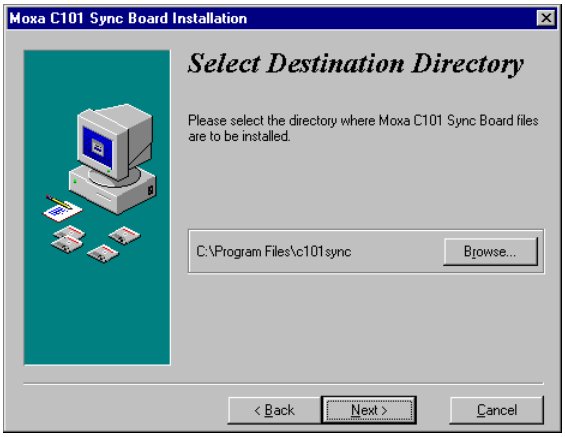


3. Click on **Browse..** and then find the **ssnt12.exe** program located on the software CD. Click **OK** to run the setup program.

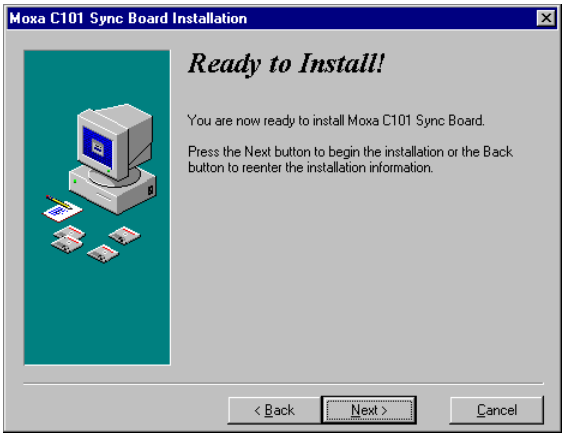
4. The **Welcome!** window opens next. Click on **Next** to proceed with the installation.



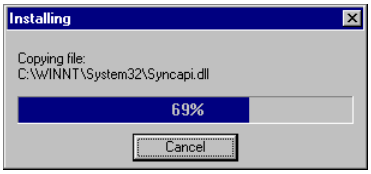
5. The **Select Destination Directory** window opens next. Click on **Next** to install the driver software in the default directory, or click on **Browse…**to specify a different folder.



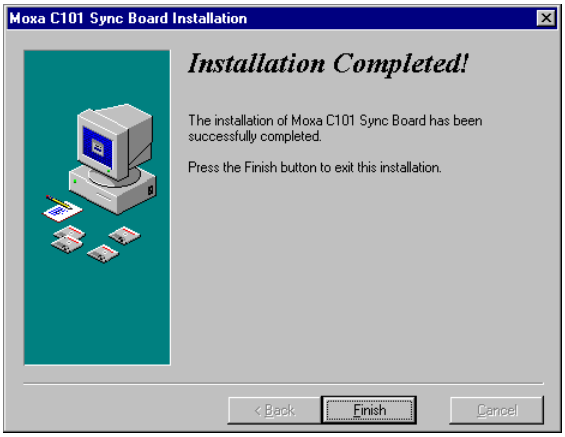
6. The **Ready to Install!** window opens next. Click on **Next** to proceed with the installation.



7. The **Installing** window indicates the progress of the installation procedure. The time required to install varies, but should take at most several seconds.



8. The **Installation Completed!** window opens next. Click on **Finish** to complete the installation.



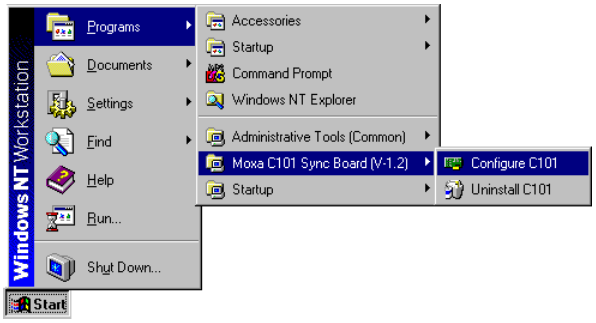
The next step is to configure the driver to work correctly with your C101 boards. The following two sections explain how to configure the C101/ISA and C101/PCI boards, respectively.

C101/ISA Board Configuration

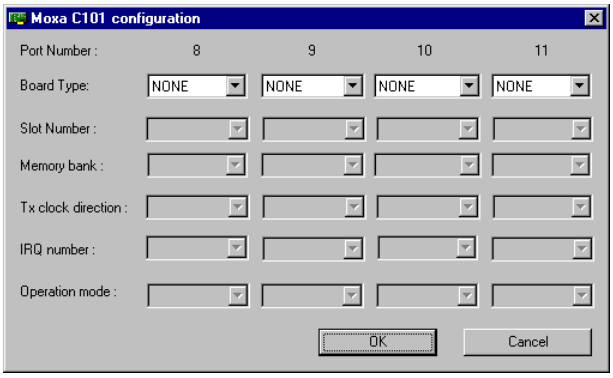
It is essential that parameters configured using the board' s configuration utility be set up in exactly the same way as was done when setting jumpers and DIP switches.

The figures in this section were generated with only one C101/ISA card installed in the PC. The figures may look somewhat different if more than one C101/ISA card is installed, or one or more C101/PCI cards are installed, but the configuration procedure is the same.

1. Either continue from the *C101 Windows NT Driver Installation* section, or click on **Start → Programs → Moxa C101 Sync Board (V-1.2) → Configure C101** to start the C101 configuration utility.

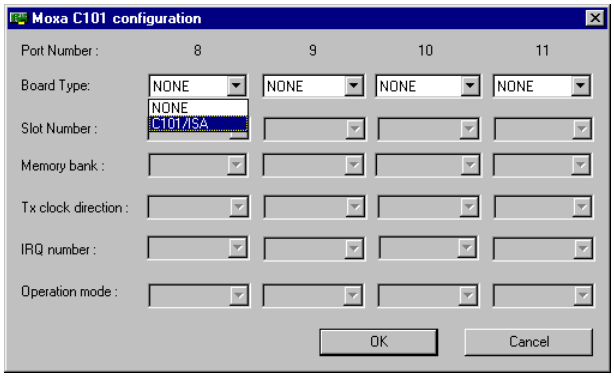


2. The **Moxa C101 configuration** window opens, as shown below.



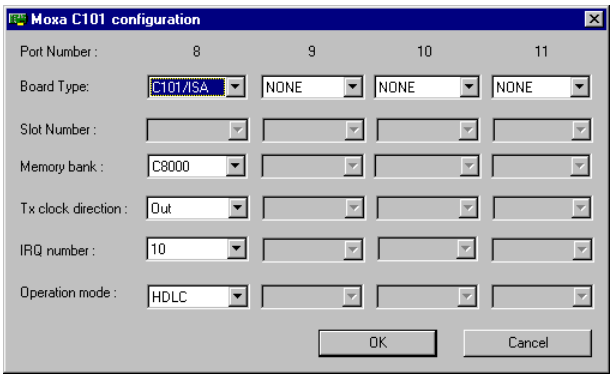
3. Choose the **Port Number** (8, 9, 10, or 11) that you intend to associate with your C101/ISA board, and then click on the drop down button under that number located to the right of **Board Type**. In this example, we associate Port Number 8 with the installed C101/ISA board.

   Position the cursor over **C101/ISA**, and then press the left mouse button.

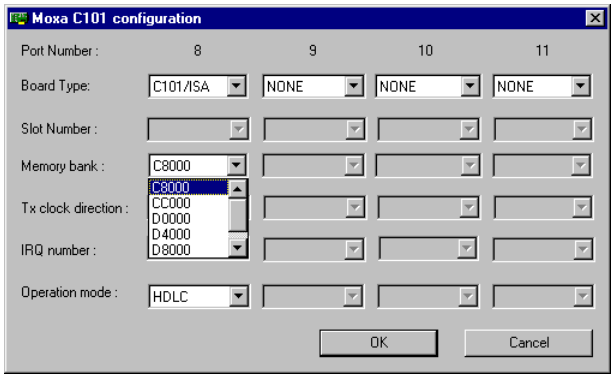


4. Certain *default values* will appear in the **Memory bank**, **Tx clock direction**, **IRQ number**, and **Operation mode** slots under the chosen Port Number.

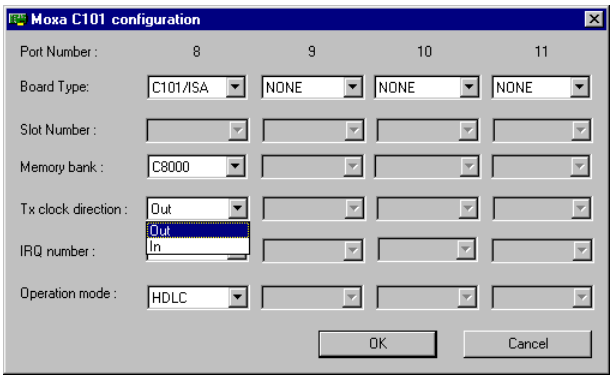
   WARNING: These values may be different from the board values that were set using jumpers and DIP switches during the Hardware Installation procedure discussed in Chapter 2. You must take care to **set up the same values** while carrying out the software configuration procedure described below.



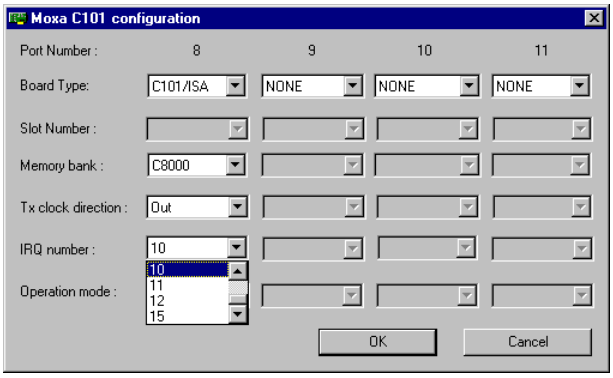
5. Click on the drop down button to the right of **Memory bank**, position the cursor over the correct value (0xC8000, 0xCC000, 0xD0000, 0xD4000, 0xD8000, or 0xDC000), and then press the left mouse button to choose that value.



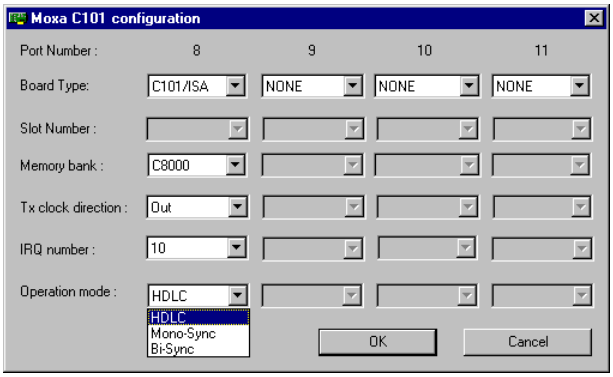
6. Click on the drop down button to the right of **TX clock direction**, position the cursor over the correct value (Out or In), and then press the left mouse button to choose that value.



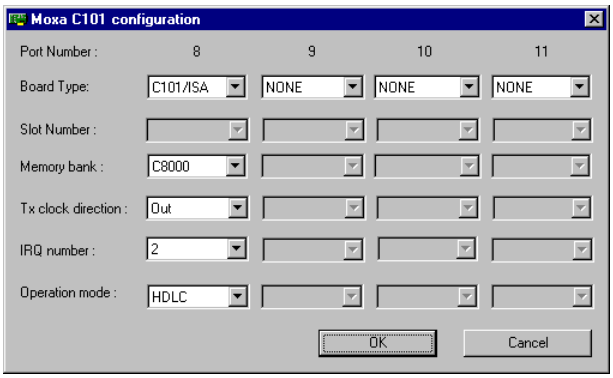
7. Click on the drop down button to the right of **IRQ number**, position the cursor over the correct value (2, 3, 4, 5, 7, 10, 11, 12, or 15), and then release the left mouse button to choose that value.



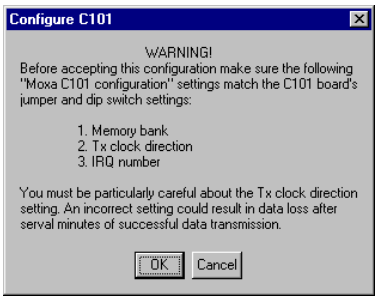
8. Click on the drop down button to the right of **Operation mode**, position the cursor over the correct value (HDLC, Mono-Sync, or Bi-Sync), and then press the left mouse button to choose that value.



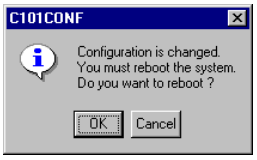
9. The Moxa C101 configuration window will display the selected values for your C101/ISA board. Click **OK** to accept these values.



10. The following **Warning!** window will open to remind you to double check that the configuration parameters you have selected should match those set using jumpers and DIP switches. Click **OK** to configure



11. You will be prompted to reboot the operating system. Click **OK** to reboot, or **Cancel** to postpone the reboot until a later time.

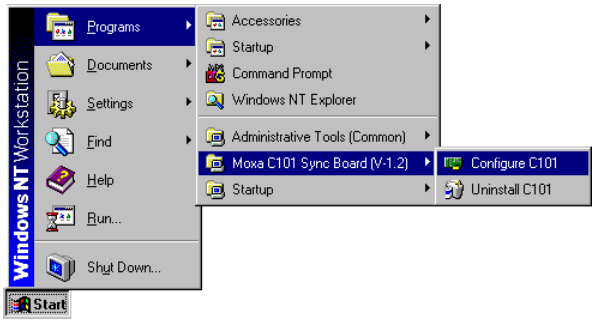


C101/PCI Board Configuration

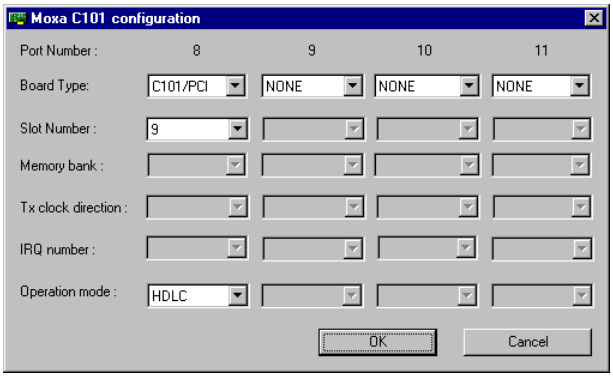
The C101/PCI board is an example of what is often referred to as an “intelligent” board. This is due to the fact that it has an on-board CPU that takes care of some of the data transmission tasks. Compared to the ISA board, there are fewer user-configured parameters, since many of the parameter values are automatically set by the operating system on boot-up.

The figures in this section were generated with only one C101/PCI card installed in the PC. The figures may look somewhat different if more than one C101/PCI card is installed, or one or more C101/ISA cards are installed, but the configuration procedure is the same.

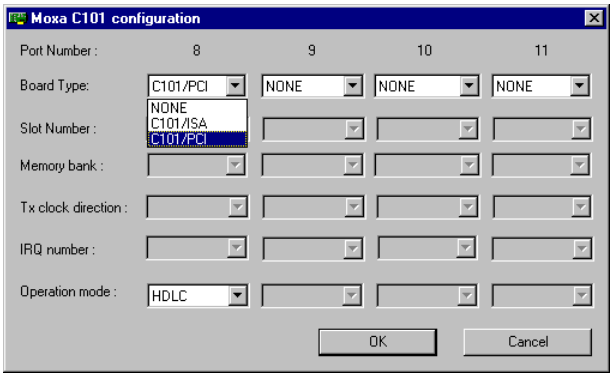
1. Either continue from the *C101 Windows NT Driver Installation* section, or click on **Start → Programs → Moxa C101 Sync Board (V-1.2) → Configure C101** to start the C101 configuration utility.



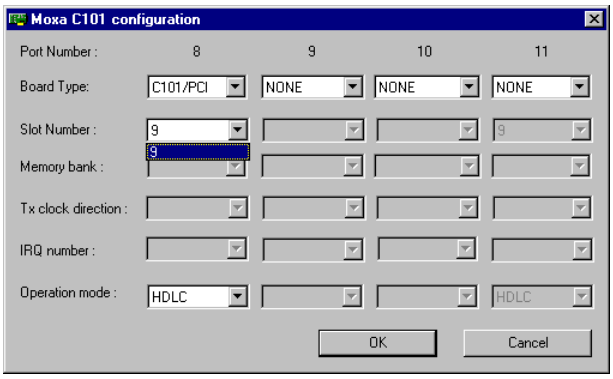
2. A free **Port Number** will automatically be assigned to the C101/PCI board. In the example shown here, Port Number 8 is assigned.



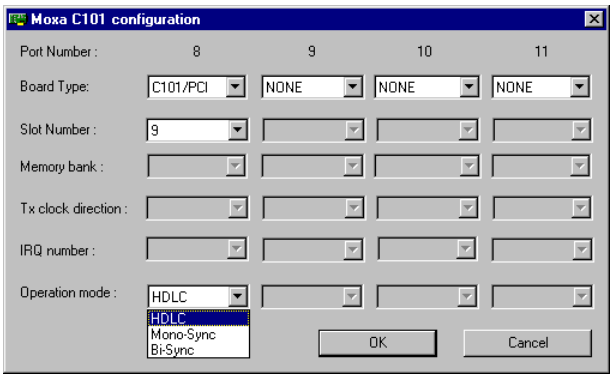
3. To choose a different Port Number, first click on the Board type pull down button for the currently selected Port Number, and select None. Next, click on the Board type pull down button under the desired Port Number, and select C101/PCI.



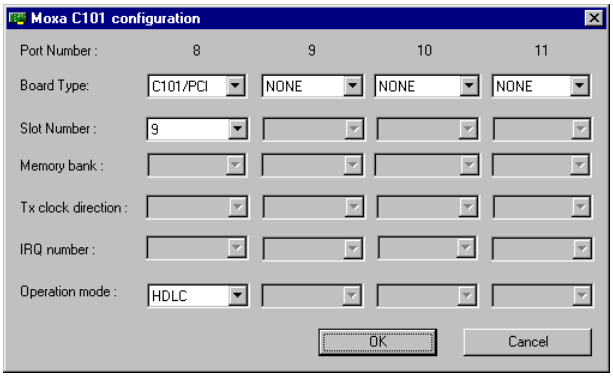
4. Click on the drop down button to the right of **Slot Number** to choose the Slot Number for the board. If only one C101/PCI board is installed then there will only be one choice for this parameter.



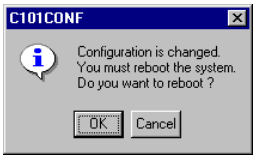
5. Click on the drop down button to the right of **Operation Mode** to choose the correct value (HDLC, Mono-Sync, or Bi-Sync).



6. Click **OK** to accept the displayed configuration parameters.



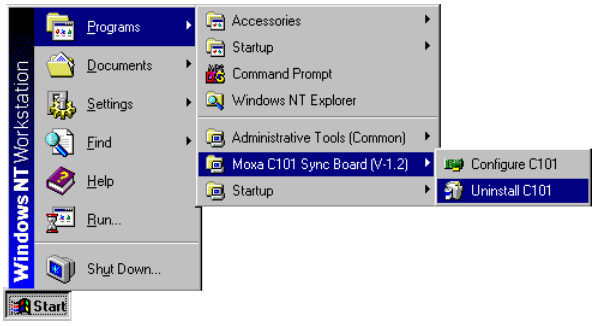
7. You will be prompted to reboot the operating system. Click **OK** to reboot, or **Cancel** to postpone the reboot until a later time.



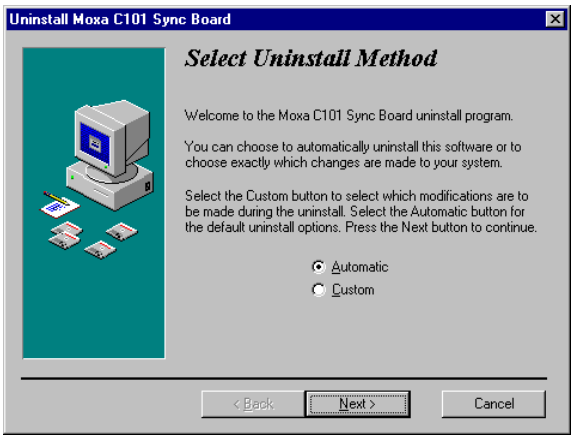
Uninstalling the C101 Driver

Moxa provides a convenient Uninstall program that can be used to completely remove the C101 driver software from your system. Use the following procedure to uninstall the driver software.

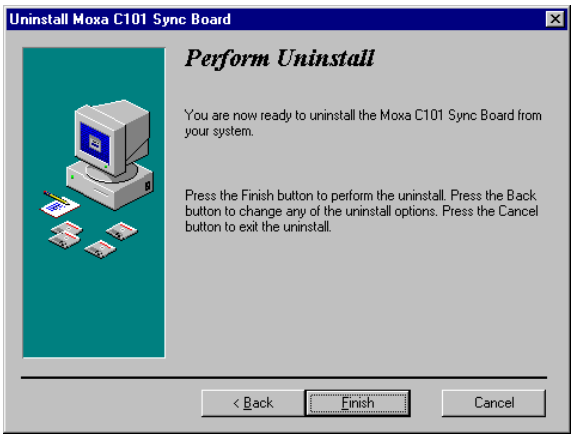
1. From the Windows NT desktop, click on **Start → Programs → Moxa C101 Sync Board (V-1.2) → Uninstall C101**.



2. Select **Automatic** to completely remove the driver software, or select **Custom** to remove portions of it, or to make certain modifications.



3. Click on **Finish** to complete the uninstall procedure.



MS-DOS

Moxa provides an MS-DOS driver and convenient configuration utility for the C101/ISA board.

C101/ISA MS-DOS Driver Installation

1. Create a directory on your computer's hard disk. You may choose whatever name you wish for the directory—in the following example, we use the name **C101DOS**.
2. Copy all the contents (files and folders) of the **C101 Dos** folder from the software CD to folder C101DOS just created on your hard drive. Check the contents of the C101DOS folder to make sure it contains the following:

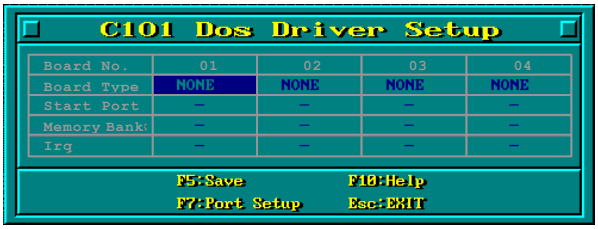
```
Bin         [subdirectory]
Example     [subdirectory]
Lib         [subdirectory]
Readme      [file]
```

3. You must work from "real DOS mode". If necessary, shut down your NT system and then reboot under real DOS mode.

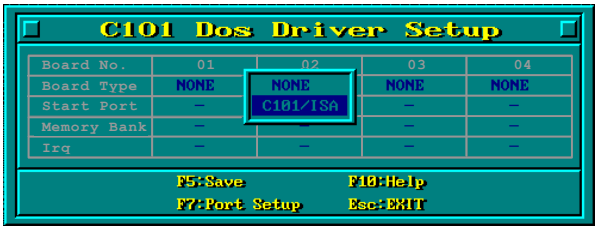
4. Run the program **SETUP.EXE** (located in the **Bin** subdirectory) from the MS-DOS prompt. The program is run by typing `setup` to the right of the MS-DOS prompt. Note that you may need to first use the *Change Directory* (CD) command to switch to the Bin subdirectory, as shown below.

```
C:\>CD C101DOS

C:\C101DOS>CD BIN

C:\C101DOS\BIN>setup
```

5. If you are installing the board for the first time under MS-DOS, then you should see the following window. Use the left/right arrow keys to highlight the **None** under the desired **Board No.**, and then press **Enter**.

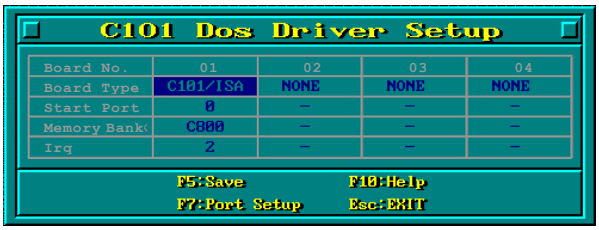


6. A small selection window will open. Use the down arrow to highlight **C101/ISA**, and then press **Enter** to select this option.

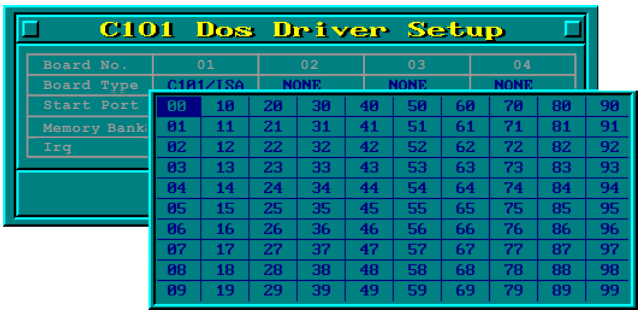


7. The setup program will automatically assign values to **Start Port**, **Memory Bank**, and **Irq**.

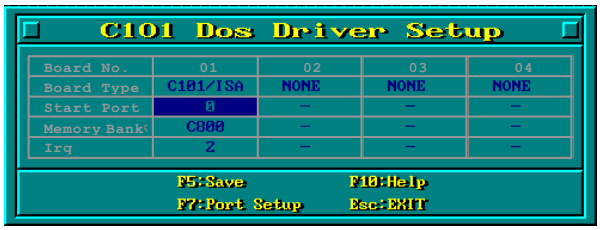
   WARNING: These values may be different from the board values that were set using jumpers and DIP switches during the Hardware Installation procedure discussed in Chapter 2. You must take care to **set up the same values** while carrying out the software configuration procedure described here.



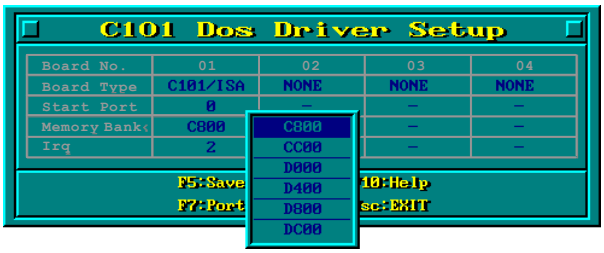
8. To change the **Start Port** value, use the down arrow to highlight the value to the right of Start Port, and then press **Enter** to open the following options window.



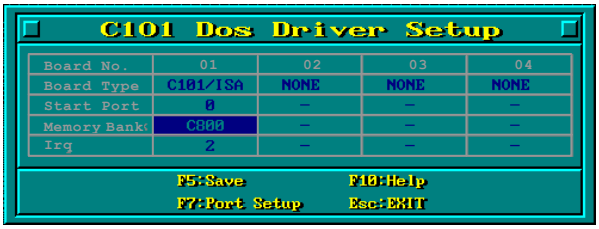
9. Use the left/right and up/down arrow keys to select the desired number, and then press **Enter** to accept the value.



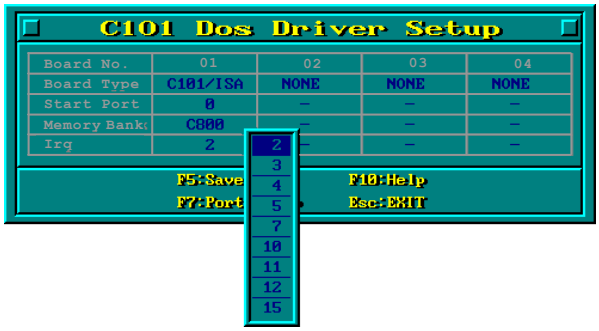
10. To change the **Memory Bank** value, use the down arrow to highlight the value to the right of Memory Bank, and then press **Enter** to open the following options window.



11. Use the left/right and up/down arrow keys to select the desired number, and then press **Enter** to accept the value.



12. To change the **Irq** value, use the down arrow to highlight the value to the right of Irq, and then press **Enter** to open the following options window.

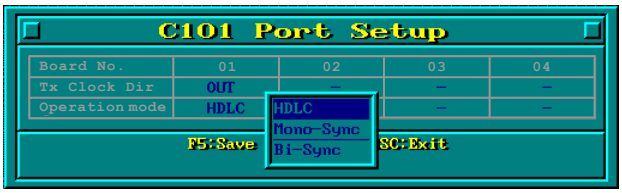


13. Use the up/down arrow key to highlight the desired value, and then press **Enter** to accept this value.

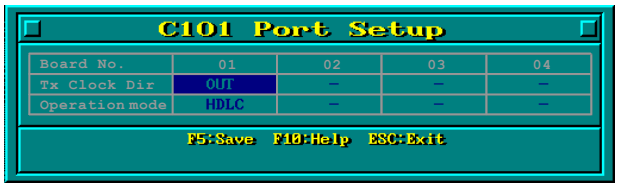
14. At this point, you will need to set up the port' s **Tx Clock Dir** and **Operation mode** parameters. To do this, press the **F7** key, in which case the Tx Clock Dir parameter will be highlighted.

15. Press **Enter** to display the following selection window. Use the up/down arrow to select the desired value, and then press **Enter** to select the value.

16. To change the **Operation mode**, use the down arrow to highlight the value to the right of Operation mode and then press **Enter** to open the following selection window.



17. Use the up/down arrow to choose either **HDLC**, **Mono-Sync**, or **Bi-Sync**, and then press **Enter** to select that option.



18. The final step is to run the program **C101-DRV.EXE** from the DOS prompt to TSR the driver. The program is run by typing `C101-DRV` to the right of the MS-DOS prompt. Note that you may need to first use the *Change Directory* (CD) command to switch to the Bin subdirectory, as shown below.

```
C:\>CD C101DOS

C:\C101DOS>CD BIN

C:\C101DOS\BIN>C101-DRV
```

NOTE: After you TSR the driver, you may include 'syncapi.h' and 'syio_cX.lib' in your programs, and use the associated library functions.

4

PIN Assignments and Cable Wiring

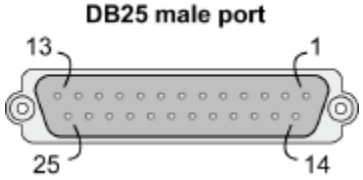
This chapter includes pin assignment diagrams, and instructions on how to make your own cables

- **Pin Assignments**
- **Cable Wiring**

C101/ISA Pin Assignments

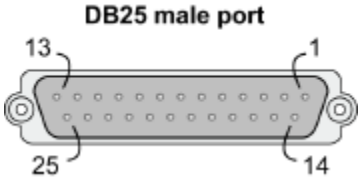
DB25 Interface

(NOTE: This is the standard RS-232 interface.)



Pin	Signal	Direction
2	TxD	Out
3	RxD	In
4	RTS	Out
5	CTS	In
6	DSR	In
7	GND	---
20	DTR	Out
8	DCD	In
24	TxC	Out
15	TxC	In
17	RxC	In

V.35 Interface (ISA)

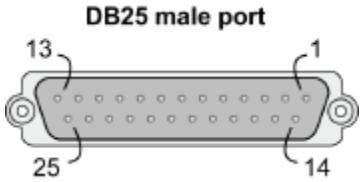


DB25 Pin	Signal	V.35 Pin	Direction
2	TxDA	P	Out
14	TxDB	S	Out
3	RxDA	R	In
16	RxDB	T	In
15	TxCA	Y	In
13	TxCB	AA	In
24	TxCA	Y	Out
23	TxCB	AA	Out
17	RxCA	V	In
19	RxCB	X	In
4	RTS	C	Out
5	CTS	D	In
20	DTR	H	Out
6	DSR	E	In
8	DCD	F	In
7	GND	B	---

C101/PCI Pin Assignments

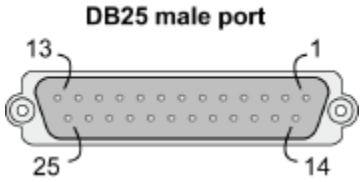
DB25 Connector

(NOTE: This is the standard RS-232 interface.)



Pin	Signal	Direction
2	TxD	Out
3	RxD	In
4	RTS	Out
5	CTS	In
6	DSR	In
7	GND	---
20	DTR	Out
8	DCD	In
24	TxC	Out
15	TxC	In
17	RxC	In
25	232EN	floating

V.35 Interface (PCI)



DB25 Pin	Signal	V.35 Pin	Direction
11	TxDA	P	Out
10	TxDB	S	Out
13	RxDA	R	In
12	RxDB	T	In
16	TxCA	Y	In
14	TxCB	AA	In
21	TxCA	Y	Out
19	TxCB	AA	Out
23	RxCA	V	In
22	RxCB	X	In
4	RTS	C	Out
5	CTS	D	In
20	DTR	H	Out
6	DSR	E	In
8	DCD	F	In
7	GND	B	---
25	232EN	⌐¬	Short for V.35
9	GND	⌐¬	

Problem Report Form

C101 ISA/PCI SuperSync Board

Customer name:	
Company:	
Tel:	**Fax:**
Email:	**Date:**

1. **Moxa Product:** ☐ C101/ISA ☐ C101/PCI
2. **Serial Number:** _____
3. **C101 Firmware Version:** _____
4. **DSU/CSU:** Make_____Model_____
5. **PC Host:** Make _____ Model _____
6. **CPU:** Speed _____MHz Make _____ Model ____
7. **Ethernet Card :** ☐ ISA Card Make_____ ☐ PCI Card Make: _____

Problem Description: Please describe the symptoms of the problem as clearly as possible, including any error messages you see. We may have to follow your description to reproduce the symptoms, so please give a complete description of the problem.

RETURN PROCEDURE

For product repair, exchange, or refund, the customer must:

- Provide evidence of original purchase.
- Obtain a Product Return Agreement (PRA) from the sales representative or dealer.
- Fill out the Problem Report Form (PRF). Include as much detail as possible for a shorter product repair time.
- Carefully pack the product in an anti-static package, and send it, pre-paid, to the dealer. The PRA should be visible on the outside of the package, and include a description of the problem, along with the return address and telephone number of a technical contact.